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G06F 17/30

(52) UK CL (Edition S)

G4A AKS AUB

(56) Documents Cited

US 4318184 A

'Help' system, Netscape® Communicator 4.51 for
Windows®, Mar 1999 . 'Help' system, Novell®
Groupwise®4.1a for Windows®, Nov 1996 . 'Help'
system, Corel® WordPerfect® Suite 8 for Windows®,
Jun 1997.

(58) Field of Search

UK CL (Edition R) G4A AKS AUB

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Online: COMPUTER, EPODOC, INSPEC, Internet,
JAPIO, TDB, WPI

(54) Abstract Title

Searching for items in an electronic catalogue

(57) A computer-implemented method is described, for searching for items in an electronic catalogue, e.g. an on-line catalogue accessible over the Internet. A hierarchy of category names is defined, each item in the electronic catalogue being associated with one of those category names. When a search page is accessed, the category names are scanned, to generate a list of words that appear in the category names at any level of the hierarchy. The list of words, 41, is displayed in the search page, allowing a user to select one. When the user selects a word from the list, a list of items, 43, whose category names contain the selected word is displayed.

Categories containing the word

Search
42

Print(ing)/Print(ers)	▼
Card(s)	▲
Fax	
Laser	
Modem(s)	
Paper	
Print(ing)/Print(ers)	
Toner	▼

41

Search Results

ABC Inkjet paper	▲
ABC Laser paper	
Q43 Laser printer	
XXX Inkjet paper	
Z4000 Inkjet printer	
⋮	
⋮	
⋮	
⋮	▼

43

FIG. 4

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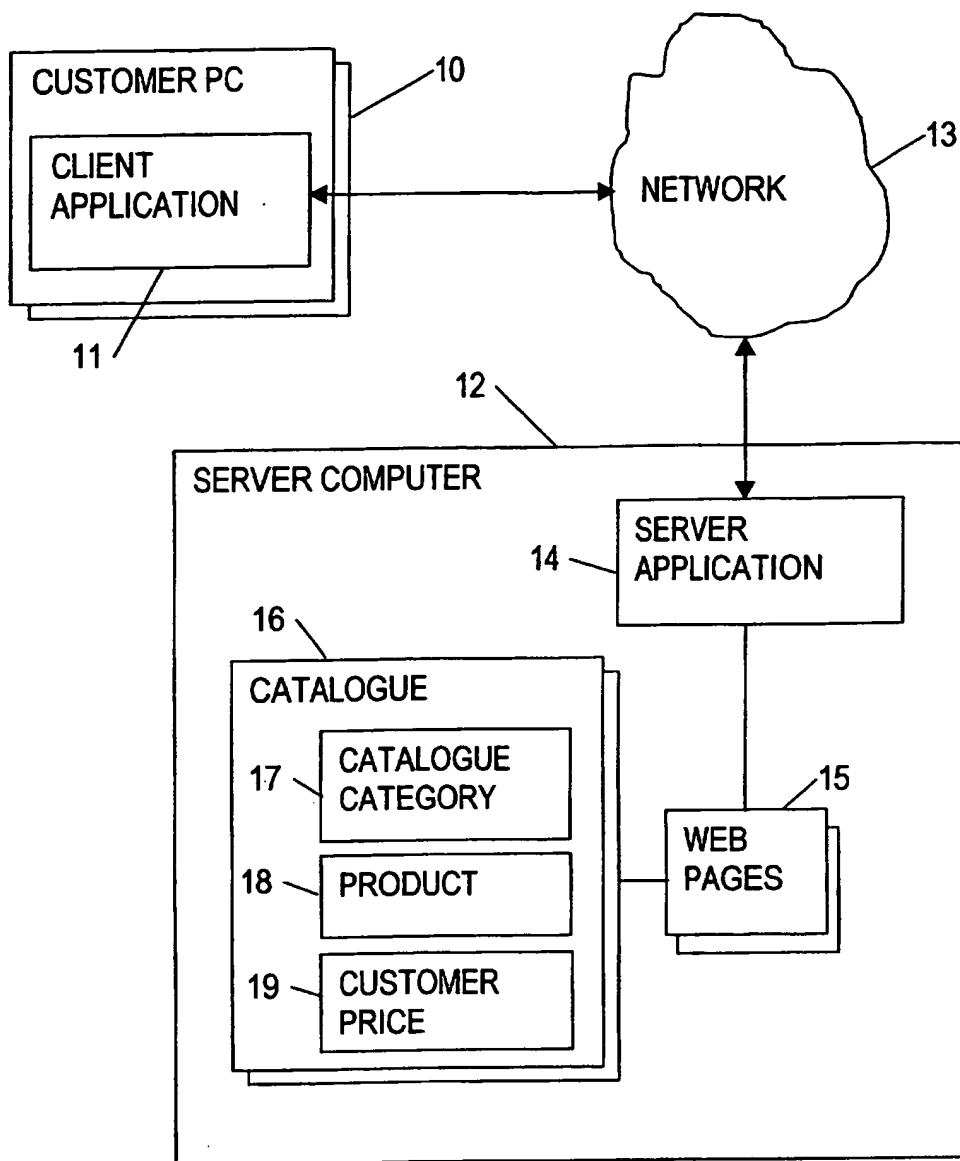


FIG.1

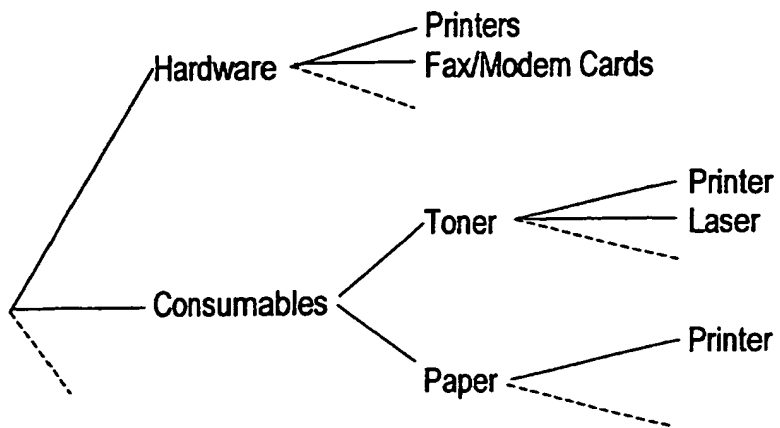


FIG. 2

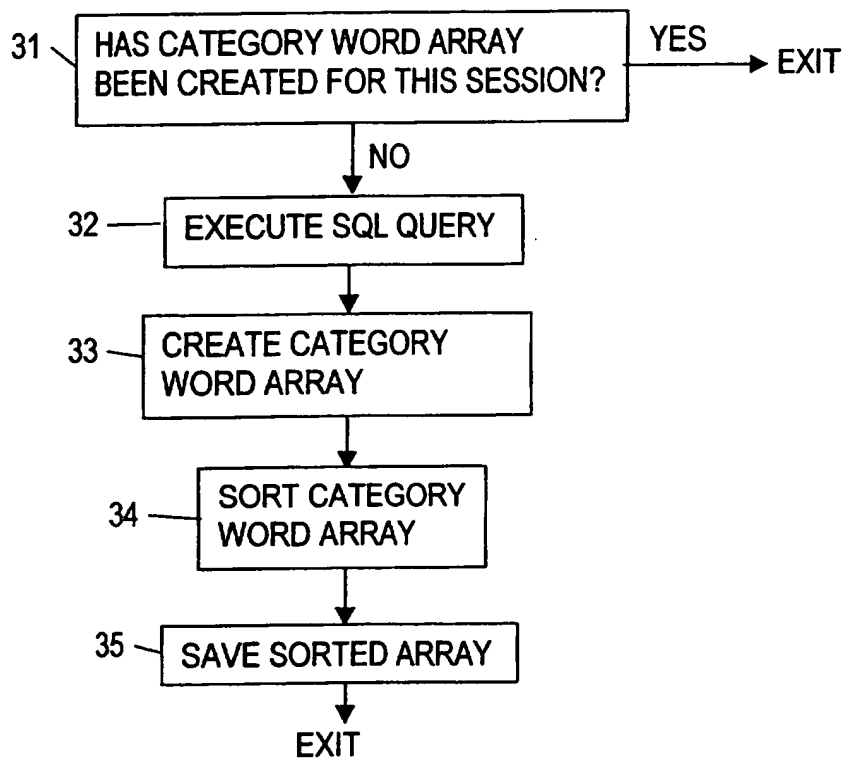
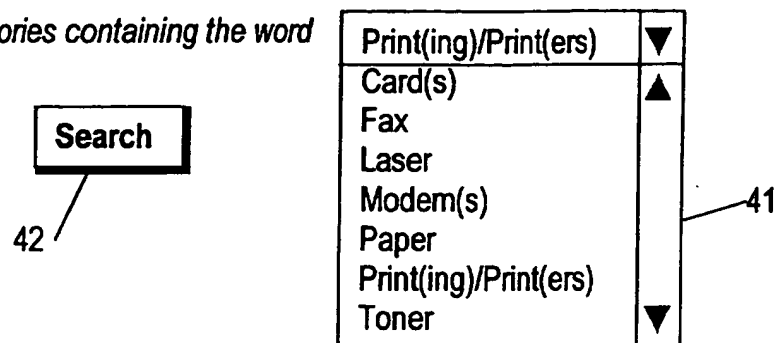


FIG. 3

Categories containing the word



Search Results

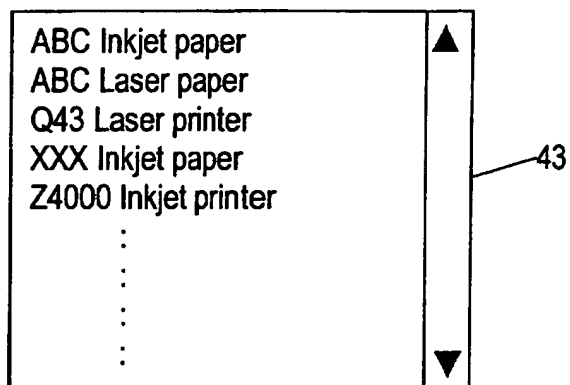


FIG. 4

SEARCHING FOR ITEMS IN AN ELECTRONIC CATALOGUE**Background to the Invention**

This invention relates to a method for searching for items in an electronic catalogue. The invention is particularly, although not exclusively, concerned with on-line electronic catalogues that allow a user to purchase selected products over a network such as the Internet.

It is convenient to organise the items in an electronic catalogue in a hierarchy of categories. For example, in a catalogue for office supplies, the items may be grouped into top-level categories such as "hardware" and "consumables", which in turn are subdivided into lower-level categories. The user can then search this hierarchy, to find the desired items.

However, a problem with such an arrangement is that related items may appear in different branches of the hierarchy. For example, printers (such as laser printers) may appear under the "hardware" top-level category, while paper and toner for printers may appear in respective sub-categories under the "consumables" top-level category. This can make it difficult for the user to find items.

The object of the present invention is to provide a way of making it easier for a user to find items in a hierarchically-structured electronic catalogue.

Summary of the Invention

According to the invention, a computer-implemented method for searching for items in an electronic catalogue comprises the steps:

(a) defining a hierarchy of category names, and associating each item in the electronic catalogue with one of those category names;

- (b) generating a list of words that appear in the category names at any level of the hierarchy;
- (c) displaying the list of words to a user, and allowing a user to select from the list; and
- (d) when the user selects a word from the list, displaying a list of items whose category names contain the selected word.

Brief Description of the Drawings

Figure 1 is a schematic diagram of a computer system for providing an electronic catalogue service.

Figure 2 is a diagram showing a hierarchy of category names.

Figure 3 is a flowchart depicting a process for generating a list of words that appear in category names.

Figure 4 is a simplified view of a typical Search page for use in searching for items in the catalogue.

Description of an Embodiment of the Invention

One method in accordance with the invention will now be described by way of example with reference to the accompanying drawings.

Figure 1 shows a computer system for providing an electronic catalogue service to a number of customers. Each customer has a personal computer (PC) 10, which runs a client application 11. The client application may be a standard web browser, or may be a bespoke application. The customer PCs are connected to one or more server computers 12, by way of a network 13. In this example, the network 13 may be the Internet, or an in-house Intranet.

Each server computer runs a server application 14, for delivering a number of web pages 15 to the client applications.

The web pages provide an interface to one or more electronic catalogues 16, allowing a customer to view the catalogues, to select items, and to place orders for the selected items. In the present example, the web pages 15 are implemented as active server pages (ASP).

Each catalogue 16 includes a database structure, including the following tables: CatalogueCategory (17), Product (18), and CustomerPrice (19), as well as other tables, not shown.

The CatalogueCategory table 17 defines a hierarchical (tree-like) structure of categories for items in the catalogue. As an example, Figure 2 shows part of a possible category hierarchy. This hierarchy can be defined by a CatalogueCategory table as follows:

<i>Catalogue Index</i>	<i>Catalogue IndexText</i>	<i>Category Level</i>	<i>Parent Index</i>	<i>...</i>
1	Hardware	1	0	...
2	Printers	2	1	...
3	Fax/Modem Cards	2	1	...
:	:	:	:	...
10	Consumables	1	0	...
11	Toner	2	10	...
12	Printer	3	11	...
13	Laser	3	11	...
:	:	:	:	...
20	Paper	2	10	...
21	Printer	3	20	...
:	:	:	:	...

It can be seen that the CatalogueCategory table includes the following columns:

- CatalogueIndex - an index number, uniquely identifying a particular category.
- CatalogueIndexText - a text string, indicating the name of the category.
- CategoryLevel - a number indicating the level of the category within the hierarchy. The top-level categories ("Hardware" and "Consumables") are at level 1. In the present example,

the hierarchy is restricted to three levels, i.e. the maximum level number is 3.

- ParentIndex - a pointer to the parent of the current category within the hierarchy. In the above example, "Consumables" is the parent category for "Toner" and "Paper".

The Product table 18 contains an entry for each product in each of the electronic catalogues. This table includes the following columns:

- PartNumber - a number identifying a particular product.
- CatalogueIndex - a reference to an entry in the CatalogueCategory table.

It can be seen that the Product table therefore assigns each product to a particular category. In general, all products of the same type (e.g. printers) are assigned to the same category.

The CustomerPrice table 19 includes the following columns:

- CustomerCode - a code identifying a particular customer catalogue.
- PartNumber - a reference to an entry in the Product table, identifying a particular product.
- Price - the price of this product in this catalogue.
(Different catalogues may contain different prices, depending on discounts etc. that may have been negotiated).

The CustomerPrice table holds an entry for every permitted combination of customer and product. If an entry does not exist for a particular customer-product combination, this means that the customer in question is not able to access this product through the electronic catalogue system.

The web pages 15 include a "Search" page, which allows a customer to search for products. Whenever this search page is opened, a SelectWords routine is executed, e.g. by means of ASP code embedded in the page. Referring to Figure 3, the SelectWords routine performs the following steps.

(Step 31) The SelectWords routine first checks whether an array, referred to hereinafter as the SortedCategoryWords array, has already been created for the present session. If so, the SelectWords routine immediately exits. If, on the other hand, a SortedCategoryWords array has not yet been created in the present session, the routine continues with the following steps.

(Step 32) SelectWords executes an SQL query on the database tables 17-19, and stores the result in a result set RS. The SQL query is as follows:

```
SELECT CatalogueIndexText, cc.CatalogueIndex
FROM CatalogueCategory cc, CustomerPrice cp, Product p
WHERE cc.CatalogueIndex= p.CatalogueIndex
      AND cp.PartNumber = p.PartNumber
      AND cp.CustomerCode = SessionCC
UNION
SELECT cc2.CatalogueIndexText, cc2.CatalogueIndex
FROM CatalogueCategory cc, CatalogueCategory cc2, CustomerPrice
cp, Product p
WHERE cc.CategoryLevel = 3
      AND cc.ParentIndex= cc2.CatalogueIndex
      AND cc.CatalogueIndex= p.CatalogueIndex
      AND cp.PartNumber = p.PartNumber
      AND cp.CustomerCode = SessionCC
```

In the above, SessionCC represents the customer code of the customer who initiated the current session.

It can be seen that the first part of this query (up to the keyword "UNION") selects CatalogueIndexText and CatalogueIndex from the CatalogueCategory table for all cases where an item in the category in question may be ordered by the current customer. These categories will all be leaf nodes of the category hierarchy. The second part of this query (following the keyword "UNION") selects these values from all entries in the

CatalogueCategory table that are parents of level 3 entries that may be ordered by the current customer.

As an example, the result set RS might appear as follows:

CatalogueIndexText	Catalogue Index
Printers	2
Fax/Modem Cards	3
Printer	12
Laser	13
Printer	21
Toner	11
Paper	20

(Step 33) Each of the results in RS is then selected in turn, until the last result in RS is reached. For each result in RS, a SplitWords function is called. This splits compound entries in the CatalogueIndexText (i.e. entries comprising multiple words separated by spaces and slashes) into discrete words. For example, the entry "Fax/Modem Cards" is split into three separate words "Fax", "Modem" and "Cards".

The SplitWords function in turn calls a CheckWord function, which replaces certain predetermined words with a generalised version of that word, which covers variants of the word and related words. For example:

- "CD", "CD-R", "CD-ROM" or "CD-ROMs" is replaced by "CD(-R)/CD-ROM(s)"
- "Card" or "Cards" is replaced by "Card(s)"
- "Modem" or "Modems" is replaced by "Modem(s)"
- "Printer", "Printers", "Print" or "Printing" is replaced by "Print(ing)/Printer(s)"

The CheckWord function thus provides a way of removing certain inconsistencies in the category names. Any words not replaced by CheckWord (such as "Fax", "Toner" and "Paper") simply remain as they are.

Each of these words is then added to a CategoryWords array, along with its corresponding CatalogueIndex number. If the word already appears in the array, the CatalogueIndex number is simply appended to the existing entry for that word, separated by a comma from the previous number.

As an example, the CategoryWords array might appear as follows:

Word	Catalogue Index
Print(ing)/Print(ers)	2,12,21
Fax	3
Modem(s)	3
Card(s)	3
Laser	13
Toner	11
Paper	20

CategoryWords thus comprises a list of words that appear in the category names at any level of the hierarchy, together with a comma-separated list of CatalogueIndex values for each of those words.

(Step 34) CategoryWords is then sorted into alphabetical order on "Word", to produce a new array, SortedCategoryWords.

(Step 35) SortedCategoryWords is then stored in a session variable, so that it will be available the next time the customer accesses the search page in the same session.

Figure 4 is a simplified view of a typical Search page. The page includes a drop-down list 41, in which all the words from SortedCategoryList are displayed. The customer can select any one of these words, by clicking on it in the normal manner.

The page also includes a Search button 42. Clicking on this button calls a function that looks up the selected word in the SortedCategoryWords array, to get the CatalogueIndex values associated with that word. These CatalogueIndex values are then

used to look up the other database tables, to get information about the associated products, and a list of these products is displayed in a scrollable window 43. The displayed list of products may for example be sorted into price order or alphabetically. In the example shown in Figure 4, the customer has selected "Print(ing)/Print(ers)", and as a result a list of all products whose category names contain the words "Printer", "Printers", "Print" or "Printing" is displayed in the window 43.

The customer may then select products from this list, for adding to a purchase order. The manner in which the products are selected and the purchase order is processed forms no part of the present invention and so will not be described further.

Some possible modifications

It will be appreciated that many modifications may be made to the system described above without departing from the scope of the present invention. For example, the category hierarchy is not necessarily restricted to three levels. Also, different catalogues 16 may reside on different computers.

CLAIMS

1. A computer-implemented method for searching for items in an electronic catalogue, comprising the steps:
 - (a) defining a hierarchy of category names, and associating each item in the electronic catalogue with one of those category names;
 - (b) generating a list of words that appear in the category names at any level of the hierarchy;
 - (c) displaying the list of words to a user, and allowing a user to select from the list; and
 - (d) when the user selects a word from the list, displaying a list of items whose category names contain the selected word.
2. A method according to Claim 1 wherein the step of generating the list of words includes splitting compound category names into individual words.
3. A method according to Claim 1 or 2 wherein the step of generating the list of words includes replacing certain predetermined words with generalised versions of those words.
4. A computer system for searching for items in an electronic catalogue, comprising:
 - (a) means for defining a hierarchy of category names, and associating each item in the electronic catalogue with one of those category names;
 - (b) means for generating a list of words that appear in the category names at any level of the hierarchy;
 - (c) means for displaying the list of words to a user, and allowing a user to select from the list; and
 - (d) means for displaying a list of items whose category names contain a selected word.
5. A computer system according to Claim 4 including means for splitting compound category names into individual words.

6. A computer system according to Claim 4 or 5 including means for replacing certain predetermined words with generalised versions of those words.

7. A method or system substantially as hereinbefore described with reference to the accompanying drawings.



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Claims searched: All

Examiner: Geoff Western
Date of search: 15 May 2000

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): G4A (AKS, AADB)

Int Cl (Ed.7): G06F 17/30

Other: Online : COMPUTER, EPODOC, INSPEC, Internet, JAPIO, TDB, WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	US 4318184 A (MILLETT et al)	-
X	'Help' system, Netscape® Communicator 4.51 for Windows®, Mar 1999. See screen-dumps.	1-6
X	'Help' system, Novell® Groupwise® 4.1a for Windows®, Nov 1996. See screen-dumps.	1-6
X	'Help' system, Corel® WordPerfect® Suite 8 for Windows®, Jun 1997. See screen-dumps.	1-6

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.